Propane Flame Weed Burners, DIY

Allen Dong, PO Box 413, Veneta, OR 97487
https://sites.google.com/view/low-tech-farm-tools

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A flame shield on a propane burner protects the flame from wind, confines the flame to a smaller area and allows burning weeds as close as ½ inch away from a crop row.

A customized propane weed burner jet is made using a brass sprayer nozzle (Figure 1) attached to a perforated pipe to serve as a mixing chamber for air and propane, while protecting the flame from the wind. Perforations on the pipe are adjusted by trial-and-error to produce a blue or blue with orange halo flame and with resistance to flame extinction when subjected to cross wind. The blue flame has the highest flame temperature, but low visibility in direct sunlight. Flame size, color, and stability are affected by the gas pressure (gas regulator setting) and propane exit velocity (orifice size at the burner head and the needle valve setting).

Components for the propane weed burner are described in Figure 1. The perforated pipe is silver-soldered on the TeeJet No. 1325 cap. All other copper components are also soldered with silver solder. Sprayer parts are available from agricultural, fertilizer, and sprayer suppliers. Propane parts are available from camping and propane suppliers. Approximate cost is $75 (including the cost of the propane bottle). TeeJet No. 5053 strainer located between nozzle body (H1) and orifice disk (H2) traps debris that may plug the orifice disk.

Burn time is 3 hours per gallon of propane using a 0.020-inch diameter orifice disc (TeeJet 4916-20) as gas regulator and one burner head with a 0.041-inch orifice disc (TeeJet D2).

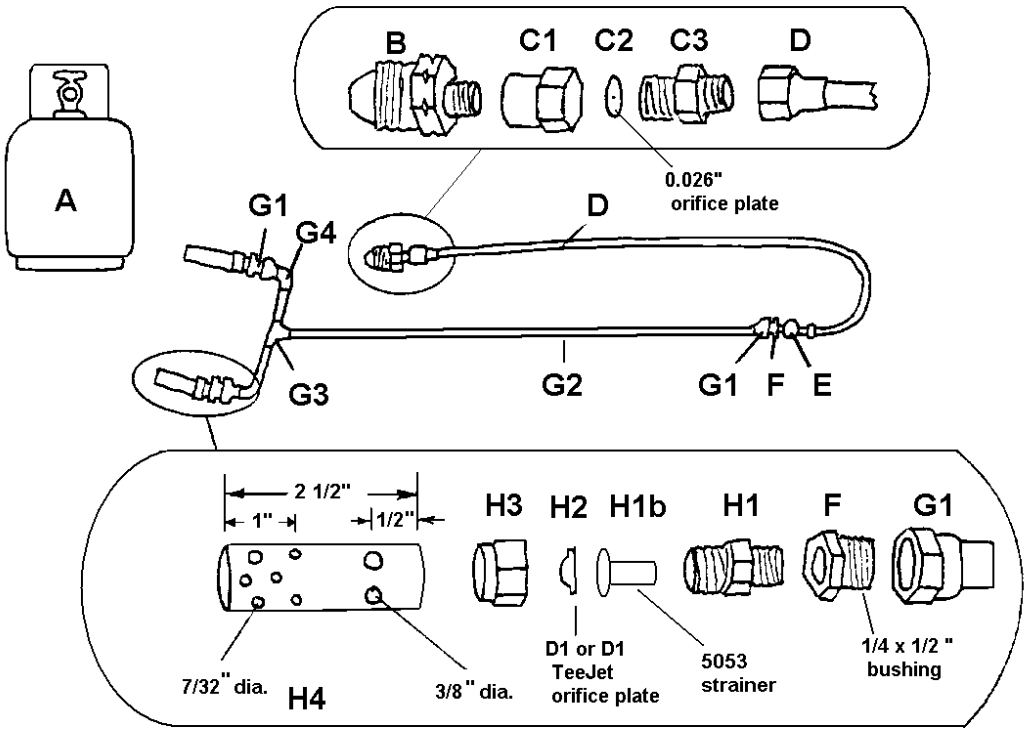


Figure 1. Narrow flame propane weed burner with 2 burner heads.

A Propane bottle, 1 gallon
B POL connector, ¼ inch male pipe thread, preferably with a Restricted inlet hole, 0.018-to-0.030-inch diameter
C Gas regulator (omit C1 to C3 if POL connector is restricted)
  C1 TeeJet 4676 adapter, ¼ -inch brass
  C2 TeeJet 4916-20 orifice disc (0.020-inch diameter)
  C3 TeeJet type TT nozzle body, ¼ inch male, brass
D Propane hose, 4 feet length, ¼ -inch pipe thread, female-male
E Needle valve, ¼ inch, female-male
F Pipe bushing, ½ to ¼ inch pipe thread
G Wand made from 1/2-inch copper plumbing
  G1 Two adapter, ½ inch copper x ½ female pipe thread
  G2 ½ inch copper tube, 24 to 30 inch long
  G3 ½ inch copper tee
  G4 ½ copper street elbow
H Burner head
  H1 TeeJet type TT nozzle body 1/4-inch male, brass (same as C3)
  H1b Strainer 5053 prevent debris plugging orifice disk H2
  H2 Orifice disc, 0.031-to-0.047-inch diameter (TeeJet DI, D2 or D3)
  H3 TeeJet No. 1325 cap, brass (can be substituted with TeeJet No.4676 cap)
  H4 ½ inch steel pipe x 2 ½ inch; four 3/8-inch diameter holes, drilled 1/2 inch from one end of the tube; sixteen 7/32-inch diameter holes, drilled in four sets of 4 in the last 1-inch of the tube

Use with caution. Propane is a pressurized flammable gas. All connections and solder joints must be properly sealed, without any gas leaks. Conduct initial flame tests in the shade or in low light conditions to enhance flame visibility.

Applications:

- **Hand held propane weeder with two burner jets outside of the shield**

The flame shield (Figure 2) protects 5-inch-tall crop while burning both sides of the crop row. The two burner heads are separated 6 inch on-center and held 1 1/2 inch above the ground surface by straddling the flame shield. This configuration was field tested on 5-inch-tall garlic plants. It was easier to walk backwards, pulling the burner along, rather than forwards, pushing the burner ahead. Burn time was approximately 2 hours per gallon of propane using 2 burner heads with a 0.031-inch diameter orifice discs (TeeJet D1), and a 0.018-inch diameter orifice disc as gas regulator (TeeJet 4916-18).

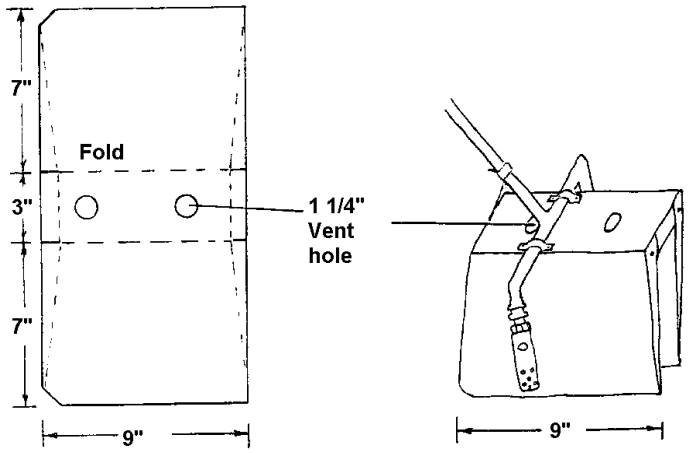


Figure 2. Propane weed burner with crop tunnel shield constructed from a 9 x 17 x 0.047 inch (18 gauge) sheet metal.

- **Hand held propane weeder with burner jets inside of the flame shield**

The flame shield (Figure 3) protects the flame from cross wind, traps heat and allows the burner to be placed within ½ inch away from the crop.

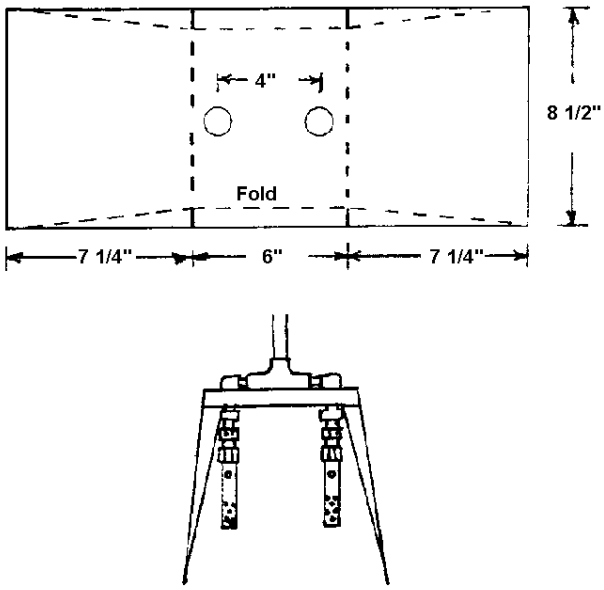
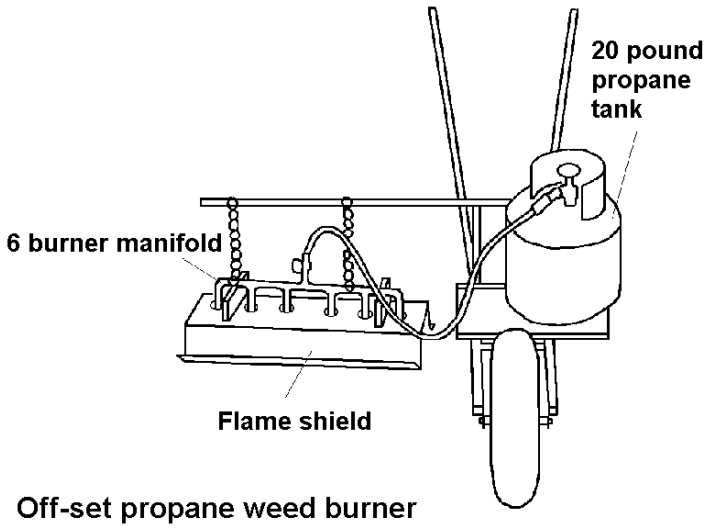


Figure 3. Propane weed burner with a flame shield. The flame shield is constructed from an 8 1/2 x 20 1/2 x 0.047-inch sheet metal.

- **Off-set walk-behind propane flame weeder**

This walk-behind propane weed burner (Figure 4 and 5) has a burner manifold suspended off the side of a single wheel cart. It allows a worker to walk on the tractor-wheel row instead of walking on top of the crop bed. Flame weeding a 40-inch bed (5 feet on-center tractor wheel spacing) is done in 2 passes, weeding half of the bed from one wheel row and the other half from the adjacent wheel row. The propane tank is positioned off-center as a counterweight to the burner manifold. The suspension chain adjusts the clearance of the burner manifold above the crop bed. The single wheel cart is a modified wheel barrel without the barrel.



Off-set propane weed burner

Figure 4. Offset propane weed burner allows walking on tractor wheel row while flaming a bed.

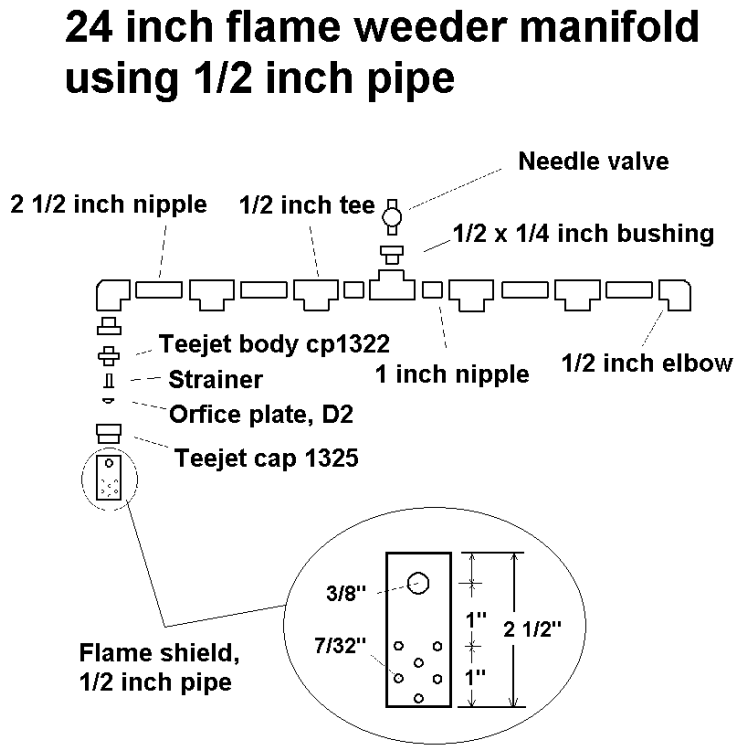


Figure 5. Details of offset propane burner manifold with 6 jets, constructed from ½ inch steel pipe; a lighter version uses copper pipe.

- **Tractor mounted, 3 bed flame weeder**.

Each bed flame weeder unit has a flame shield and 6 jets connected to a 5-gallon propane tank. The flame shield protects the jets from cross wind and confines the flame to the bed area.

Figure 6. Three bed, tractor mounted flame weeder.

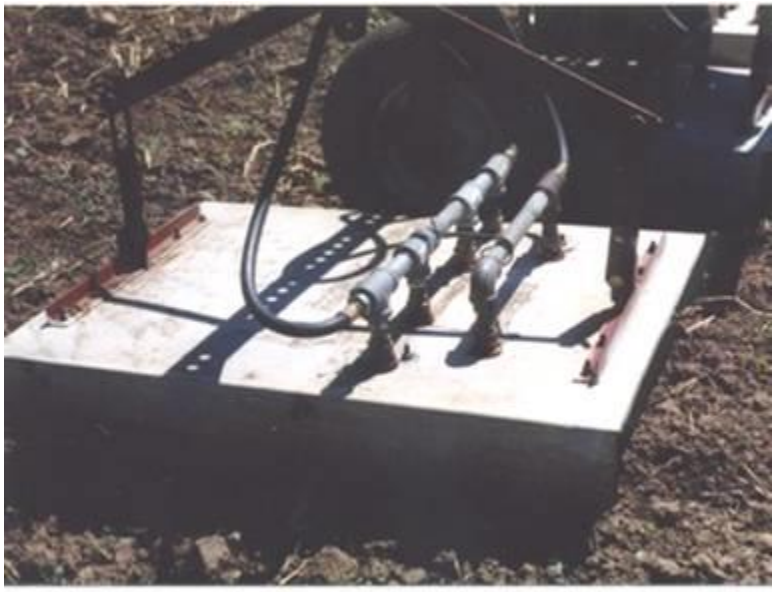


Figure 7. Close up of tractor mounted flame weeder.

- **Modified commercial hand-held flame weeder**

A flame shield is added to a hand-held propane weed burner (BernzOmatic Outdoor Torch model JT800). With this modification, the burner can be placed within 1/2 inch from the crop and used between crop rows. The burn time is approximately 6 hours per gallon of propane.

Construction:

Cut and fold the sheet metal as shown in Figure 9. Secure the four folded corners with sheet metal screws. Insert a hose clamp through the two slots on the

center tab and attach the flame shield to the burner wand. Insert the steel support wire through the hole at edge of sheet metal, 1/2 inch in, and bend the wire 270 degrees to secure it. Attach other end of the wire to the burner wand using a hose clamp.

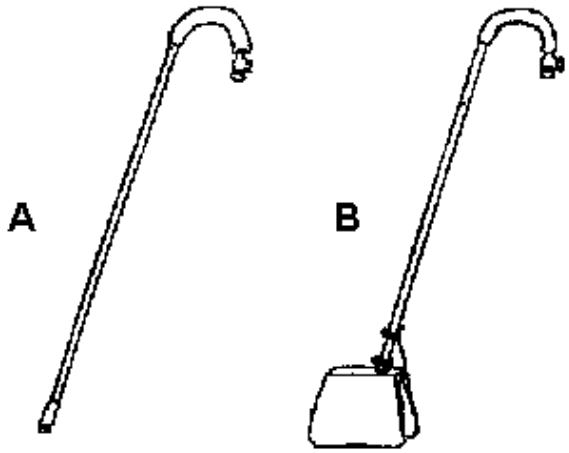


Figure 8: A) BernzOmatic Outdoor Torch, B) Torch with flame shield.

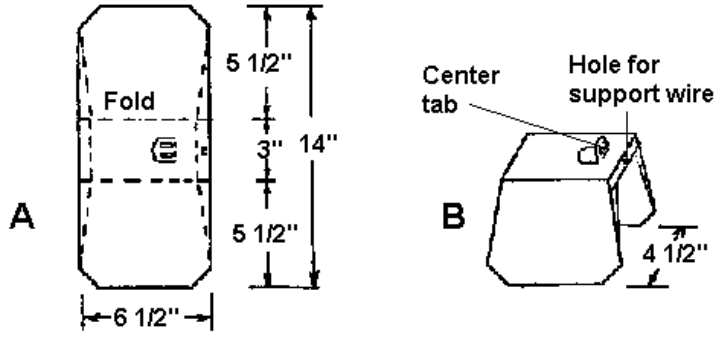


Figure 2: A) Sheet metal, 6½ x 14 inches, B) Sheet metal folded into a flame shield

Acknowledgements: Technical assistance from Roger J. Edberg, University of California, Santa Cruz.

"TeeJet" products are manufactured by "Spraying System Co.", P.O. Box 7900, Wheaton, IL 60189-7900, USA.
Mention of product name and store name does not imply endorsement.